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INFANTILE PARALYSIS—AFTER EFFECTS AND TREATMENT

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Acute anterior poliomyelitis, or infantile paralysis, as it is ordinarily called, is an acute inflammation of the anterior horns of the gray matter of the spinal cord. The inflammatory stage lasts from four to six weeks. It is most common among children of two to three years of age, and in severe cases produces a paralysis of groups of muscles. The onset is sudden and the paralysis is usually most extensive in the beginning, a certain amount of improvement taking place subsequently. The affected muscles atrophy rapidly, the reflexes in them are lost, and reaction of degeneration develops. From contraction of antagonistic muscles, deformities occur later in life.

This disease has increased with remarkable suddenness in the United States within the last decade. The observation of a large number of cases in northern Europe and more recently in this country proved that it is a disease of communities and not of individuals. This disease seems to exhibit a tendency to recur with greater severity in alternating seasons and investigating authorities have noted that there was almost invariably a comparatively complete immunity from the disease during a year following a season of unusual severity.

The contributions of laboratory workers all over the world—notably in this country at the Rockefeller Institute—by Flexner, Lewis, Clark, Noguchi, and others, were of great benefit. This work established the infectious character of the disease by transferring poliomyelitis to monkeys and identifying the experimental poliomyelitis of monkeys with the epidemic and sporadic disease occurring in man; thus the infectious agent could be studied and the mechanisms by which it invades the body and thrives there. Among many other important points established, these studies have disclosed the development of immunity principles in the blood of man and monkey and devised a test for their existence in the blood serum. These studies have shown that the infectious material has egress from the body through the nasal mucous membrane and the intestinal tract; that insects may be passive carriers of contagion, and that human beings themselves, although well, may yet transmit the disease.

Paralysis among various domestic animals has been reported coincident with or just preceding epidemics of infantile paralysis among human beings. Many of the reports are of doubtful authenticity, but contain enough of fact to make them worthy of investigation.[1]

The name "Infantile paralysis," in the light of recent investigations, is a misnomer, as we have learned during the epidemics in the United States that adults as well as infants are attacked and often with greater severity. It has been observed also that parallel with the cases of paralytic or the more newly recognized cerebral meningitic forms of the disease, there were certain cases which progressed up to a certain point in identical fashion, but which did not develop any of the severe nervous symptoms or paralysis and which recovered. These so-called abortive cases were recognized with considerable frequency and the addition of this class of cases widened the view greatly.

The epidemic of 1916 more clearly demonstrated what was already known with reasonable certainty, namely, that the number of comparatively comfortable patients of poliomyelitis probably equals those who are manifestly ill with the disease, and that the disease exists in stages comparable to the generally accepted course of such a disease as measles or smallpox, i. e., an incubation period, a period of early symptoms, a latent period, and a period of invasion. The period of incubation is usually short—one, two, or three days. The early symptoms may easily be mistaken for indigestion or grippe, after which, as mentioned before, many cases are convalescent with no paralysis or other complications. A blood test in these cases, however, shows an immunity to the disease.

Quoting from an article on The Early Recognition of Poliomyelitis, by Royal Storrs Haynes, M.D.[2]

> The knowledge we possess of Poliomyelitis is extensive and has been a part of medical literature for years. It has seemed, therefore, that the generally confessed ignorance, which was so prominent a part of the lay and medical writings of last summer, was unnecessary; it was the ignorance of not having used the knowledge available. It created greater alarm on the part of the general public than was necessary or right. Even imperfect as the knowledge claimed was, it was quite as great as we possess of scarlet fever, over which disease we seldom become hysterical.

In our clinical work we often find children who have had an attack of poliomyelitis with some other disease such as measles or scarlet fever, which is not recognized until the paralysis is noticed later. The second group of symptoms, and often the only ones noted, consist most frequently of high fever, vomiting, patient extremely sensitive to touch—especially the skin and muscles of the back—stiffness of neck, rigidity of spine or of a set of muscles of the extremities.

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[1] Note: See Investigation of Dr. Theo. Smith, of Harvard Medical School.

[2] *Archives of Pediatrics*, June, 1917.

Treatment.—With few exceptions, patients seem more comfortable without a pillow under the head. The child should be moved only when absolutely necessary during the early acute stage of the disease, as pain upon handling and upon motion is often extreme. Owing to their inflamed condition, the nerve cells of the anterior horn of the spinal cord should be given all possible rest and not overburdened with sensory impulses which they cannot properly transmit into motor activity without further injury. The nurse should, when changing the bed linen, lift the child from the crib and place it upon a table or empty bed, as turning from side to side is extremely painful. Great care should be used in supporting the whole body, and not allowing the paralyzed limb to drag. A child should never be lifted by the feet, even to adjust a napkin, as anterior flexion of the spine causes excruciating pain and may result in permanent deformity.

In no other acute disease must the respiratory movements be so closely watched as in poliomyelitis. Any change in type of breathing should be considered as of grave prognostic significance in spite of the fact that there is very little change in pulse and temperature. Paralysis of both diaphragm and abdominal muscles of respiration leads invariably to a fatal outcome, but when the intercostal muscles are completely paralyzed and the diaphragm only slightly so, it is possible to maintain the respiration by various artificial methods and the use of oxygen, until nature is again able to assume control.

Pressure sores are not characteristic of this disease, but every precaution should be used in guarding against them, such as keeping the child well nourished, all bony prominences watched and protected to see that the skin surfaces do not lie in contact. This latter point is to be guarded against in the spastic encephalic variety, where the fingers are flexed upon the palm and there is a tendency towards ulceration. Different solutions may be used as are often suggested, but equally good or better results may be obtained by gently washing the part with a mild non-irritant soap and water, following with very gentle massage.

Hot baths are of great value in the treatment of poliomyelitis. The beneficial influences seem to be derived in several different ways: they refresh the patient and tend to calm the nervous excitability so commonly present; the circulatory system in general is stimulated, and of particular value is the local effect upon the cutaneous capillaries of the paralyzed part. Bringing the blood to the surface lessens also the congestive condition of the tissues of the nervous system; most important, however, the buoyance of the warm water enables the child to move more easily and possibly with less pain than under other circumstances and thus entices him to make movements he probably otherwise would not attempt. A blanket or two may be folded and placed in the tub with an air cushion for the child's head. The temperature of the water should be between 97 and 100 degrees Fahrenheit. It will be found helpful to have a rubber ball, a toy balloon, or some such toy, floating upon the surface of the water, which will help to entertain the little patient. The baths should be given once or twice in twenty-four hours, according to reaction previously obtained. Their duration should be from 20 to 30 minutes. A cold water bath is not advisable, as the circulatory system is often already in such a condition that the shock may be decidedly detrimental.

In Dr. Regan's report of treatment of 1798 cases during the epidemic in New York City in 1916, he describes the beds used as consisting of blanket mattress on a woven wire spring which provided a level and firm support. A spring which sags, or a mattress worn in the center, would do harm by predisposing to faulty positions and hence to deformities, especially to those of the spine. The pressure of covers must be guarded against very carefully, as they have a tendency to increase "toe drop," a deformity which is relatively frequent.

Epidemics occur most frequently in the summer, so it seems practicable to use outing flannel gown or pajamas and warm stockings instead of covers; it is less irritating to the patient and an additional advantage lies in the fact that it is possible to continuously observe the feet and legs—a valuable consideration in poliomyelitis. A light wool blanket may be kept folded at the foot of the bed for use at night. If heavier clothing must be used, it is well to provide a wooden or wire cradle to protect the feet from the weight.

Rest is an all-important part of the treatment. Place as comfortably as possible in a quiet room so as to exclude all noises and bright lights. Sleep should be thus encouraged, for the entire nervous system is concerned in the inflammation, and the less demands made upon it at this period, the better the ultimate outcome will be.

Diet.—A good diet for children over one year of age consists of milk for the first three or four days, then bread and cereal may be added, and usually after the seventh day the child may be given a full diet consisting of everything but meat. Soup and custards may be given, and once a day apple sauce or prunes.

Children show loss of appetite early in the disease and feeding is not crowded, but as soon as practicable the child is fed according to his individual needs. Many writers mention the inordinate appetite observed in convalescents. There is practically no danger in giving a full diet early in the disease, because nephritis is an almost unknown complication.

Inability to cry indicates the bulbar or facial type of the disease. The muscles of the pharynx and esophagus are sometimes involved in the paralysis and it is with great difficulty that these patients are fed. Where in addition to the muscles of swallowing, there is marked respiratory difficulty, the nutrient enema is often found superior to the introduction of the stomach tube. Six or eight ounces per feeding, dependent upon the age, should be given at six-hour intervals. If the artificial introduction of food has to be employed as long as a week or ten days, it is advisable to alternate with the gastric gavage, if the respiratory symptoms permit this course of action.

Retention of urine is unusual in the younger children. When it does occur, it commonly yields to palliative measures. With older children and adults, this complication is more frequent and we have to resort to catheterization.

In many cases lumbar puncture affords symptomatic relief as a therapeutic measure. When there are stupor, twitchings, convulsions and respiratory embarrassment, lumbar puncture is important. It is reported that few deformities develop where patients are kept under supervision. It is very important to keep the limbs in correct position, whether the patient is lying, sitting, or standing; as in toe drop, hip or knee flection, claw fingers, shoulder drop, dropped wrist, etc. Excellent results may be obtained from the use of improvised splints of card board, slings, pads, adhesive, tape, plaster shells and covered bricks. A stretched muscle loses power of contractility. Braces should be made as light as possible and should be supplied immediately when the body weight-bearing tends to produce strain or deformity.

It must be borne in mind that there is on the part of nature a tendency present in each case towards *spontaneous improvement.* This encouraging feature may be active for months and even years after the disease. It is stated, however, by a masseuse at a children's orthopedic hospital that more can be accomplished within the first two years than during the next ten. The extensor muscles are more often involved than the flexors and most frequently those of the leg. The involvement of one leg is more complicated than if both are affected, as the shortening of one leg causes lateral curvature or scoliosus. When the extensors of the hip are paralyzed, the flexors are stronger and cause bending forward or lordosis.

Kyphosus or hump-back is an involvement of the shoulder muscles, causing the head to bend forward. The extensors of the front of the leg becoming involved, allows the tendo-Achilles to contract and remain so, deforming the foot and causing the patient to walk on the toes. The treatment has three important points—to prevent deformity, to strengthen the muscles, and to promote nutrition. The treatments are passive, assistive and resistive.

No massage is given until all soreness and sensitiveness are gone. Before beginning massage, the child should be placed in a hot bath or in an electric baker, as paralyzed feet and legs are always cold and the muscles respond slowly unless heat is first applied. The nurse takes advantage of the spontaneous impulse of the nerves to act. After first getting the attention of the child, she gives the command and assists sufficiently so that there is no mental effort lost on his part, and a smooth continuous movement is made and the normal arc is performed.

In giving the assistive and resistive treatments, care should be used not to tire; have the last movement as strong as the first. Over fatigue is the greatest detriment to improvement and is the hardest to guard against. This is especially true when children are treated in the home.

In Chicago, the care of poliomyelitis children is unique in that all treatments are given in the home. Seven nurses are employed for this particular work, supervised by Alice Pastridge, formerly assistant to Dr. Lovet of Boston. The Health Department of Akron, Ohio, also reports the work established by a nurse whom they sent to Dr. Lovet for this special training.

The mentality in poliomyelitis is in no wise impaired, with some possible exceptions in the cerebral types. This seems a special dispensation of Providence, as we sometimes find the poor little bodies so hopelessly deformed. The children, as a rule, are so optimistic and cheerful that it is a pleasure to care for them.

The portal of entry of the virus is the mucous membrane of the upper respiratory tract, hence we can readily see that a cap and gown to protect the hair and dress, and disinfectants for the hands, are not sufficient. A good prophylactic measure is the use of 5 to 10 drops of a 10 per cent. argyrol solution in the nose, so that it reaches the pharynx, three times a day; also the employment of the mouth and nose mask when waiting on the patient.

The estimated number of paralysis cases during an epidemic is 49 per cent.; the number of fatalities 10 per cent.

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WHAT I DID TO OVERCOME THE HABIT OF WORRYING

By Ethel Webb
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I suddenly realized that I had formed the habit of worrying, and I found each day I was picking up more and more to worry about until my burden was fast spoiling not only my health and life, but also the lives of others more or less intimately associated with me. I was honest enough with myself to confess that it was an unwise and ungenerous test of affection to compel my family to put up with my moods, if my cares were more or less imaginary.

I sat down with a pad and pencil and set down in black and white the things that I was worrying most about, and it proved to be a long list. Then I sorted that list and put into one group my daily anxieties; in another group, the things I was afraid might happen. I discovered the keynote to all my trouble was fear, and no matter what happened, reality was never as dreadful as my imagination and fears painted it.

I sealed the lists in two envelopes and put them away for one week, and set myself the task of forgetting my worries. I knew there must be happiness and contentment in the world and I resolved to find some. I would learn to forget all unpleasant things, for possibly my very attitude toward life was drawing these causes of unpleasantness to me; I would find out. At least I would not worry about what I could not help or hinder, and would let to-morrow's burdens wait until to-morrow.

At the end of a week I opened the envelope containing my daily worry list and found at least half the things I was bothering about had never happened; some of the things that did happen proved to be